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1941 FOREST INSECT SURVEY

SIERRA NATIONAL FOREST

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By
J. E. Patterson
Berkeley, California
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Forest Insect Laboratory
Berkeley, California
October 30, 1941

1941 FOREST INSECT SURVEY

SIERRA NATIONAL FOREST

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1941 FOREST INSECT SURVEY
SIERRA NATIONAL FOREST

INTRODUCTION

The 1941 Forest Insect Survey of the Sierra National Forest was, as in former years, made by the Forest Insect Laboratory of Berkeley, California. These annual surveys, which were inaugruated in 1930, are made for the primary purpose of ascertaining the annual insect losses in the coniferous foresta and to detect incipient epidemics that should be checked by control measures before excessive losses can occur.

The 1941 survey was carried out during the periods August 26 to September 5; and from September 13 to 15, 1941. Several members of the Berkeley Laboratory personnel participated in the field work. J. M. Miller, R. H. Hall, O. R. Struble, C. B. Eaton, and J. E. Patterson cruised the Chiquito Basin. Struble, Eaton, H. L. McKenzie, and Patterson cruised the Mariposa District and Fence Meadow. The road stripping and reconnaissances in other parts of the forest were accomplished by Struble, Eaton, and Patterson. Patterson is responsible for the interpretation of the field data and the general estimates. Assistance in reconnaissance was given by District Rangers J. K. Munhall and Eldridge Westfall of the Sierra Forest.

EXTENT AND METHOD OF SURVEY

The survey was broadened somewhat above those of previous years and was extended to include all of the commercial forested areas, and also the principal recreational regions. The entire survey area totaled 377,900 acres of forested land. The two standard methods, general reconnaissance and full coverage of sample plots, were augmented by extensive road strips in this survey. The 5 permanent sample plots were 100% cruised and all insect killed trees on them were marked and recorded. All the infestation units were covered by reconnaissance, further amplified by road survey strips. The data resulting from these surveys formed the basis for the loss estimates tabulated in the appendix, and for the appraisal of the current infestation and recommendations.

GENERAL INFESTATION CONDITIONS

In general insect activity during the year was erratic with a late seasonal inception. During the season a tendency toward grouping of attacks on pine occurred in the higher ranges with a corresponding decrease of attacks in the marginal forests. However, a general decrease over the entire forest was a marked feature of the 1941 infestation. In general the status of the 1941 infestation in pine is approximately 19 percent less than that of 1940.

Insect depredations in fir have, however, followed the opposite course, resulting in increased losses throughout these stands. It is now evident that the fir engraver beetle, after several years increase in activity, has reached a near peak and is causing disturbingly high losses. Most of this fir loss has occurred above 5000 feet elevation and largely in stands of no immediate or early utilization.

Despite the fact that the pine infestation is generally subnormal there are a few local areas where infestations have increased, or have been maintained at a high status. These areas of high intensive infestations are located in the sugar pine-ponderosa pine type at high elevations on exposed sites, and generally on ridges and high points. An outstanding example is the persistent infestation in sugar pine in the Shaver Lake unit. Here the 1940 infestation developed to rather high proportions and was considered of sufficient hazard to warrant control by direct measures. Consequently, control operations were begun in the winter and continued through the spring. However, the entire infested area was not covered and the recurrent infestation, which developed in 1941, reached nearly the same status. It is still too high for complete protection of this recreational area and a reclearing of these stands is indicated.

Another local area of the same type and characteristics is located in the Soquel Unit. Conditions in this unit parallel those of Shaver with high pine losses principally in sugar pine. However, since this area is remote and of low recreational usage control at this time is not recommended.

Infestations in Jeffrey pine during the year were generally low in the intermediate elevations, but registered high losses in stands above 7,000 feet. Such conditions are found in the upper Chiquito Basin, upper San Joaquin drainage and in the high country east of Huntington Lake.

Losses in incense cedar during the year were generally down throughout the forest.

Infestations of the mountain pine beetle in lodgepole pine have continued at a relatively high rate in several of the Alpine forests, notably in the upper San Joaquin drainage and at Kaiser and Sample Meadows. These infestations are of long standing in the two latter places, evidenced by the extensive ghost forests composed of bleached snags representing trees killed from 10 to 20 years ago.

As in previous years, the mountain pine beetle (Dendroctonus monticolae) and the western pine beetle (Dendroctonus brevicomis) continue to be the principal insects responsible for pine losses. However, the flathead beetles (Melanophila spp.) are still active, attacking sugar pine, ponderosa pine, and Jeffrey pine. The Jeffrey pine beetle (Dendroctonus jeffreyi) has caused the greater losses in Jeffrey pine in the higher elevations. The principal insect enemy of the firs is the fir engraver beetle (Scolytus ventralis). Its attacks are mainly confined to the mid-bole and tops where the initial injury results. Later the lower bole is attacked by the round head, Tetropium abietis.

During 1940 a great number of trees in the confines of the San Joaquin Canyon Burn died from the effects of fire injury and subsequent insect attack. These conditions continued through the 1941 season accumulating a mass of dead timber aggregating several thousand trees. A few groups of attacked trees, ranging from 10 to 25 individuals each, appeared at several places outside the north and east margins of the burn during the 1941 season, indicating a partial migration of beetles from the burned area. It is yet too early to determine the extent of damage in timber adjacent to the burn, or how far the infestation will spread from the burned area. This situation should be closely watched and subsequent developments carefully studied.

CONDITIONS ON UNIT AREAS

Because infestations vary within wide limits on any large forested

area smaller units become necessary in surveying and reporting annual insect conditions. The infestation units set up on this forest in 1939 are again used in this report, supplemented by new units erected to report conditions on additional areas. The measured losses on the permanent sample plots are summarized in Table I. Losses on the road strips are given in Table II. The infestation trend during the last three year period, 1939-1940-1941, is indicated by a comparison of these annual losses. These data, together with those resulting from the extensive reconnaissances, are the basis for the estimates of the 1941 unit losses shown in Table III.

Conditions on the individual infestation units are given separately for each unit.

Jerseydale Unit

The 1941 infestation on this unit is widely scattered and confined entirely to ponderosa pine. There has been a reduction in losses of 40% since the previous year. There are no present indications of a change from the current low status. This unit, and the next three are not shown on the unit map in the appendix.

Footman Ridge Unit

Infestations during the year have been decidedly endemic although registering an 18% increase over the previous year. This increase is due to the development of several small groups of infested trees, principally sugar pine on the exposed ridge sites.

Miami Mountain Unit

The infestations in the marginal type pine forest of this unit have remained static for the past three years. The loss is decidedly below normal and confined to ponderosa pine.

Signal Ridge Unit

Pine losses on this high ridge have greatly declined since the peak loss of 1939. The current loss will not exceed one tree per section throughout the unit. Fir losses, however, remain high due to the continued activity of the fir engraver beetle. The current loss in fir will average 10 trees per section.

Hugh Ryan Unit

The abrupt decline in pine infestations which began in 1940 has continued through 1941, resulting in an all time low for this unit. The current infestation shows no aggressive tendencies and is not expected to increase in the near future.

Bass Lake Unit

A decided decrease in infestation on this unit has occurred since the low of 1940. The current infestation is so low that losses are negligible. This desirable condition is due in a large measure to the maintenance control practiced yearly during the past six years in the riparian stands on this recreational area.

Soquel Unit

This is a new unit erected for the first time in order to survey the merchantible pine of this local area. Losses, principally in sugar pine, have increased 33% during the year. On the other hand fir losses showed a decrease of approximately 20%. Since the infestation has not yet reached epidemic proportions, and due to the remoteness of the area, control is not recommended at this time, although a close watch should be kept on futue developments.

West Chiquito Unit

Insect caused losses in pine have appreciably increased during the year, but are yet far from epidemic status. The increase is largely due to the development during the early season of several groups, principally ponderosa pine and Jeffrey pine, in the intermediate elevations. This grouping tendency is marked throughout these stands and may indicate the beginning of an epidemic. The fir losses have remained about the same as those of the previous year. No immediate control work is recommended. However, due to the grouping of current losses, close surveillance of the unit is warranted.

Jackass Unit

Current insect conditions are generally favorable with losses well below normal for these stands. However, the development during the early season of several large groups of infested pine has resulted in an increased loss amounting to 87% over 1940 in number of trees attacked. It is possible that these group infestations resulted from localized attacks made by beetles migrating from the San Joaquin Burn which is only a few miles distant. It is also possible that an epidemic infestation will develop from these nuclei. In view of the unusual conditions on this unit subsequent developments should be closely watched.

Rock Creek Unit

Conditions on this local watershed have remained static during the past two years with losses well below normal for these stands. The current infestation is confined exclusively to the ridges and to sugar pine.

Whiskey Creek Unit

Losses resulting from insects during the year were the lowest recorded in this unit during the past 20 years. The year's loss will not average over 5 trees per section. There are no indications of an early change from this low status.

Daulton Unit

A new unit erected to record the local conditions on the upper San Joaquin watershed, and in the upper reaches of the fire which occurred in 1939. About 1/3 of this unit was burned over at that time. The fire was severe on this area resulting in injury to practically every tree within the confines of the burn. During 1940 fire-injured trees offered desirable material for attack by barkbeetles and a great number were attacked. These attacks continued in fresh trees throughout the 1941 season, and the accumulated red-top trees which faded during the two year period constitutes a band of red trees clearly marking the expanse of the burn in this unit. It is estimated that over 2000 trees within the burn were attacked during the two year period.

During 1941 a number of group attacks developed in uninjured trees outside the burned area. These groups aggregated about 100 infested trees in September.

If the infestation in and around this burn follows the same course as on other burns studied in the past it will largely disappear during 1942, the fourth season following the fire. However, it is recommended that close watch be kept on development next year to detect possible increased infestations outside the burned area.

Canyon Unit

Another unit erected to survey and report conditions developed as a consequence of the fire of 1939 in the San Joaquin Canyon.

The intensity of the fire was so great in the lower reaches of this area that most of the timber was killed outright by the flames. A considerable area on the west flank of Kaiser Ridge was, however, only lightly scorched, and here insects have built up a considerable infestation during the two years subsequent to the fire, amounting to about 1000 trees, of which 800 were attacked in 1940. No group infestations have developed in stands outside the burned area, and the loss inside has sharply declined from the peak reached in 1940. The present indications are that the infestation in this unit is already declining. This course is expected to continue during 1942.

Huntington Lake Unit

A high mountain recreational area warranting full protection from insect depredations. The current loss is endemic in both pine and fir. The total loss in both types will not exceed 250 trees for 1941. No control work is recommended at the present time.

Shaver Unit

The area surrounding Shaver Lake is one of the principal recreation regions within the forest, and as such demands intensive protection against insect losses to realize its fullest value, hence control has been recommended on this area whenever insect infestations have threatened these values. A threatening infestation developed in the fall of 1940 and control work was carried on the following winter and spring. This work, however, did not cover the entire infested area and considerable re-infestation developed in 1941. A total of 226 infested trees were treated on about 70% of the area. The current infestation is not of epidemic proportions but is sufficient to warrant further control work, which is recommended for the spring period of 1942. The infestation covers an area of about 11 sections, all of which should be intensively covered by control work. There are approximately 200 infested trees on the area, about ½ being ponderosa pine and the balance sugar pine. Both the western pine beetle and the mountain pine beetle are the primary agents involved. The burning method of control is recommended for this area. The control area is roughly bounded on the east by Foster Ridge; on the north by Tamarack Mtn. and Music Peak; on the west by Shaver Peak and Mt. Stevenson. On the south there are extensive cutover areas.

Jose Basin Unit

This unit was erected in the 1941 survey to extend the survey area to the brush fields in the western limits. There is, at present, very little infestation in the unit, but these marginal stands are highly susceptible to insect attack and several epidemics have developed in them during the past decade. The current loss will not exceed an average of over two trees per section.

Blue Canyon Unit

Here, as in other units in the marginal stands, the infestation developed in 1941 was decidedly endemic amounting to less than three trees per section.

Dinkey Unit

Another new unit set up to survey the commercial and recreational stands of upper Dinkey Creek. Insect losses during the year in pine were subnormal, not exceeding five trees per section. Fir losses, however, have slightly increased over previous years but are not alarming. Control at the present time is not warranted or recommended.

Logging operations are in progress on a part of this unit offering green slash for beetle attack.

Fence Meadow Unit

Pine infestations on this unit have consistently declined since the completion of the last control work in the spring of 1940. This control

affected an immediate reduction of 80%, which was followed by a further reduction of 40% in the 1941 infestations. In the aggregate the 1941 loss will not exceed an average of five trees per section. This low status may be considered neglibible for these stands. On the other hand fir losses have slightly increased during the year.

As in the Dinkey Unit, logging operations are in progress in this unit. It is probable that fresh slash accummulated from these operations has absorbed some infestation which would otherwise have lodged in standing trees.

RECENT CONTROL*

Three control jobs were carried out on the forest in the spring of 1941.

The Ross Creek-Hooker Cove Project, located in Rock Creek unit was carried out by the CCC during the period April 15 to 28. The total area covered 6400 acres. A total of 17 trees containing a volume of 36,420 feet and infested with the western pine beetle was treated.

The Willow Creek Project in Bass Lake Unit was completed furing April. It included a total area of 2220 acres. A total of 44 ponderosa pine trees, with a volume of 9500 feet, were treated by CCC crews. These trees contained broods of the western pine beetle.

The Shaver Lake Project was carried out as a special project by the Forest Service personnel, hired labor and CCC crews. The total acreage covered was 12,200 acres. A total of 105 ponderosa pine, volume 155,140 feet, and 121 sugar pine trees, volume 291,760 feet, were treated. These trees were infested by the western pine beetle and the mountain pine beetle. Both the peeling-burning and peeling-sun curing methods of control were employed.

This control work was very efficiently done and at the time when maximum benefits would result.

SUMMARY

The outstanding features of the 1941 insect infestation on the forest, as revealed by the fall survey of September are:

a- The exceptionally low status of all infestations in the lower or fringe type forests.

b- The generally low pine losses in all pine timbered areas of the forest. These have sharply declined since 1940.

c- The development during the season of group infestations in certain ponderosa pine stands in the higher elevations.

d- Concentrated infestations of the mountain pine beetle in sugar pine in the highest ranges of this species occurrence.

e- The generally increased losses in fir caused by the fir engraver beetle.

f- A pronounced upward trend of infestations in Jeffrey pine in the higher ranges.

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* Summarization of data from report "Insect Control--Sierra--Spring of 1941" by W. W. Spinney. 6-6-41

During the year three control projects were completed; two in commercial stands and one on the Shaver Lake recreational area.

Control operations are recommended in the Shaver Lake Unit for the spring of 1942. The objective of this work it to cover the areas missed in the last control work, and to complete control of this unit.

TABLE I. Comparative Sample Plot Losses - 1939-1940-1941

Sample Plot	Species	1939			1940			1941		
		No. Trees	Trees Per A.	Volume B. M.	No. Trees	Trees Per A.	Volume B. M.	No. Trees	Trees Per A.	Volume B. M.
Placer	P.P.	13	0.04	4,820	8	0.03	7,500	2	0.006	1,410
RS 8	S.P.	1	0.003	3,530	2	0.006	1,050	0	0.000	
320 Acres	J.P.	18	0.06	11,210	12	0.04	11,220	5	0.02	3,850
	Total	32	0.10	19,560	22	0.07	19,770	7	0.026	5,260
	Plot Total	32	0.10	19,560	22	0.07	19,770	7	0.026	5,260
Jackass	P.P.	27	0.08	15,680	4	0.01	10,340	2	0.006	2,360
RS 9	S.P.	10	0.03	17,410	2	0.006	10,610	0		
320 acres	J.P.	1	0.003	800	2	0.006	3,110	0		
	Total	38	0.118	33,890	8	0.025	15,060	2	0.006	2,360
	Plot Total	38	0.118	33,890	8	0.025	15,060	2	0.006	2,360
Fence Mdw.	P.P.	22	0.07	52,630	4	0.01	21,240	0		0
RS 11	S.P.	5	0.02	7,000	0		0	0		
320 acres	Total	27	0.09	59,630	4	0.01	21,240	0		0
	I.C.	2	0.006	700	3	0.01	570	0		0
	W.F.	4	0.01	10,000	3	0.01	16,160	1	0.001	1,840
	Plot Total	33	0.101	70,330	10	0.03	37,970	1	0.001	1,840
Hugh Ryan	P.P.	9	0.03	7,120	2	0.006	2,380	1	0.001	400
SS-1	Total	9	0.03	7,120	2	0.006	2,380	1	0.001	400
320 acres	I.C.	2	0.006	1,200	0			1	0.001	1,570
	Plot Total	11	0.036	8,320	2	0.006	2,380	2	0.002	1,970
Signal Peak	P.P.	0			0			0		
160 acres	S.P.	4	0.02	5,200	1	0.006	5,500	0		
	Total	4	0.02	5,200	1	0.006	5,500	0		
	W.F.	5	0.03	3,600	11	0.07	14,310	11	0.07	5,680
	Plot Total	9	0.06	8,800	12	0.08	19,810	11	0.07	5,680

TABLE II. Unit Road Strip Losses - 1940-1941

Unit	Road Strip	Species	1940 No. Trees	1940 Volume B.M.	1940 Estimated Trees per Section	1941 No. Trees	1941 Volume B.M.	1941 Estimated Trees per Section
Jerseydale	464A	P.P.	8	3,200	12	5	2,000	7
Footman		P.P.	1	800	1	1	500	1
Ridge	604A	S.P.	0			1	1,200	1
Miami Mtn.	672A	P.P.	10	5,000	10	7	4,000	7
Hugh Ryan	328A	P.P.	2	800	4	3	1,800	6
West		P.P.	7	8,710	8	8	4,670	9
Chiquito	600A	J.P.	5	11,400	6	1	60	2
		S.P.	4	10,540	5	3	7,110	6
		W.P.	2	1,930	3	4	13,550	8
Jackass	480A	P.P.	14	10,620	19	37	38,300	49
		J.P.	0					
		S.P.	2	2,070	3	1	6,500	2
Rock		P.P.	6	4,800	4	6	4,200	4
Creek	992A	S.P.	3	3,000	2	2	2,800	2
Whiskey Creek	344A	P.P.	3	1,800	6	4	3,200	8
Canyon	616A	P.P.	10	5,000	10	3	2,400	3
		S.P.	2	2,400	2	1	1,600	1
Huntington		P.P.	4	4,800	3	5	6,000	5
Lake	744A	S.P.	0			1	1,800	1
Dinkey	200A	P.P.	2	1,600	6	2	1,500	4
		S.P.	4	3,600	13	2	3,200	2
Fence Mdw.	304A	P.P.	1	1,200	2	2	1,500	4
		S.P.	3	4,200	6	1	4,800	2

TABLE III. Estimated Unit Losses 1939-1940-1941

Unit	Area in Acres	Species	1939 No. Trees	1939 Volume B.M.	1940 No. Trees	1940 Volume B.M.	1941 No. Trees	1941 Volume B.M.
Jerseydale	12,800	Pine	No data		120	48,000	70	30,000
Footman Ridge	9,600	Pine	No data		55	40,000	65	52,000
Miami Mtn.	11,500	Pine	No data		90	40,000	80	32,000
Signal Ridge	12,800	Pine	60	60,000	40	56,000	20	30,000
		Fir	140	210,000	160	128,000	200	120,000
		Total	200	270,000	200	184,000	220	150,000
Hugh Ryan	14,700	Pine	125	110,000	40	32,000	20	8,000
		Cedar	45	18,000	20	10,000	25	6,000
		Total	170	128,000	60	42,000	45	14,000
Bass Lake	22,400	Pine	150	65,000	70	28,000	40	16,000
Soquel	16,000	Pine			60	50,000	80	68,000
		Fir	No data		90	63,000	70	40,000
		Total			150	113,000	150	108,000
West Chiquito	34,500	Pine	1120	496,000	280	112,000	400	460,000
		Fir	90	50,000	125	65,000	120	190,000
		Total	1210	546,000	405	177,000	520	650,000
Jackass	25,600	Pine	1000	1,020,000	240	190,000	450	500,000
		Fir	60	60,000	40	50,000	100	160,000
		Total	1060	1,080,000	280	240,000	550	660,000
Rock Creek	16,600	Pine	377	897,000	90	60,000	120	82,000
Whiskey Creek	11,500	Pine	250	75,000	110	33,000	75	32,000
Daulton	33,000	Pine	No data		1400	840,000	820	396,000
		Fir			120	60,000	60	24,000
		Total			1520	900,000	880	420,000
Canyon	14,000	Pine			800	640,000	160	104,000
Huntington Lake	29,000	Pine	No data		160	112,000	130	70,000
		Fir			50	30,000	120	72,000
		Total			210	142,000	250	142,000
Shaver	32,000	Pine	No data		300	360,000	260	200,000
		Fir			70	40,000	60	35,000
		Total			370	400,000	320	235,000

(Continued next page)

TABLE III. (continued)

Unit	Area in Acres	Species	1939 No. Trees	1939 Volume B.M.	1940 No. Trees	1940 Volume B.M.	1941 No. Trees	1941 Volume B.M.
Jose Basin	19,200	Pine	No data		60	15,000	40	10,000
Blue Canyon	25,600	Pine	256	390,000	140	160,000	80	24,000
Dinkey	25,600	Pine	No data		100	60,000	90	55,000
		Fir			40	30,000	60	35,000
		Total			140	90,000	150	90,000
Fence Mdw.	11,500	Pine	208	700,000	175	350,000	100	78,000
		Fir			40	24,000	60	50,000
		Total	208	700,000	215	374,000	160	128,000
TOTAL	377,900		6729	6,785,400	8635	6,388,000	7220	5,576,000

UNITED STATES DEPARTMENT OF AGRICULTURE
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FOREST INSECT SURVEY
SIERRA NATIONAL FOREST
MT. DIABLO MERIDIAN

SCALE
In 0 ½ 1 2 3 4 Miles

N

LEGEND

SAMPLE PLOT — UNIT BOUNDARY

T. 5 S.
T. 6 S.
T. 7 S.
T. 8 S.
T. 9 S.
T. 10 S.
T. 11 S.

R. 21 E.
R. 22 E.
R. 23 E.
R. 24 E.
R. 25 E.
R. 26 E.

37° 00'
10'
20'
40'
30'
20'
119°10'